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First records of the Truandó Toad, *Rhaebo haematiticus* (Cope, 1862) (Anura, Bufonidae) in the Middle Cauca river valley, Caldas, Colombia

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Abstract. We present the first records of the Truandó Toad, *Rhaebo haematiticus* (Cope, 1862), in the inter-Andean valley of the Middle Cauca River, Colombia, the second largest inter-Andean basin of the country. In Colombia, this species has been extensively documented in the Chocó biogeographic region, on the western slopes of the Cordillera Occidental, in the valley of Magdalena River, and the foothills of the western slope of the northern Cordillera Oriental. Our records help fill an expansive hiatus in the known distribution of this species and increases the number of amphibians known to occur in the basin of the Cauca River.

Keywords. Amphibians, Cordilleras, distribution update, ecoregions, Inter-Andean basin

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Introduction

Rhaebo Cope, 1862 is a Neotropical genus of large-bodied toads represented by 14 recognized species and distributed from Honduras in Central America to Bolivia, Brazil, Colombia, Ecuador, the Guianas, Peru, and Venezuela in South America (Mueses-Cisneros et al. 2012; Frost 2022). In Colombia there are 11 species: *Rhaebo andinophrynoides* Mueses-Cisneros, 2009; *R. atelopoides* (Lynch & Ruiz-Carranza, 1981); *R. blombergi* (Myers & Funkhouser, 1951); *R. ceratophrys* (Boulenger, 1882); *R. colomai* (Hoogmoed, 1985); *R. ecuadorensis* Mueses-Cisneros, Cisneros-Heredia & McDiarmid, 2012; *R. glaberrimus* (Günther, 1869); *R. guttatus* (Schneider, 1799); *R. haematiticus* (Cope, 1862); *R. hypomelas* (Boulenger, 1913), and *R. lynchi* Mueses-Cisneros, 2007. These species are mainly distributed in the Chocó biogeographic region, on the western slopes of the Cordillera Occidental, in the valley of the Magdalena River, in the foothills of the eastern slope of the Cordillera Oriental, and in the Amazon region (Mueses-Cisneros 2009; Mueses-Cisneros et al. 2012; Frost 2022).

Rhaebo haematiticus (Cope, 1862) is a large-bodied toad described from Truandó in the northern Chocó region of Colombia (Cope 1862; Frost 2022). It is a widely distributed species which also occurs in the lowlands of Honduras, Nicaragua, Costa Rica, Panama, Colombia, Ecuador, and Venezuela from sea level to

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1800 m (Mueses-Cisneros, 2009; Caicedo-Martínez et al. 2021; Frost 2022). In Colombia, this species occurs in the Chocó region, the foothills of the western slope of the Cordillera Occidental, and the Patía Valley, and it is the only species of *Rhaebo* in the Magdalena river valley, on the eastern slopes of the Cordillera Central, and the western slopes of the Cordillera Oriental as far as the Serranía del Perijá (Caicedo-Martínez et al. 2021). To date, there are no confirmed records from the basin of the Cauca River, the second largest inter-Andean basin of Colombia. Here, we present the first records of *R. haematiticus* in the Middle Valley of the Cauca River in the Department of Caldas, Colombia.

Methods

During a field trip conducted on 17 May 2022 at Vereda La Esmeralda, Reserva of the Central Hidroeléctrica de Caldas - CHEC, in the Municipality of Chinchiná, Department of Caldas, we observed an adult female toad inside a drainpipe. The individual was captured and euthanized with 2% lidocaine and fixed with 10% formalin, rehydrated in water, and preserved in 70% ethanol at the Colección de Anfibios, Museo de Historia Natural, Universidad de Caldas (MHN-UCa-Am 1540). We took the snout–vent length (SVL) and compared the external traits those available in the literature (Mueses-Cisneros 2009; Caicedo-Martínez et al. 2021). We also confirmed the identification of a previously reported juvenile specimen (MHN-UCa-Am 1167) collected in 2019 at the same municipality (Ramírez-Chaves et al. 2023). To update the distribution of *R. haematiticus*, we update Caicedo-Martínez et al.'s (2021) map of the distribution of the species in Colombia, constructed using recent and historical confirmed localities. With all this information, we list the terrestrial ecoregions (Olson et al. 2001) inhabited by *R. haematiticus* in Colombia.

Results

***Rhaebo haematiticus* (Cope, 1862)**

Figure 1

New records. COLOMBIA – Departamento de Caldas • Municipality of Chinchiná, Vereda La Esmeralda, Reserva CHEC; 05.0533°N, –075.7393°W; 883 m elev., 17.V.2022; Héctor Fabio Arias Monsalve leg. (HFA 374); 1 adult ♀, MHN-UCa-Am 1540 • Municipality of Chinchiná, Vereda La Esmeralda, San Francisco, Reserva CHEC; 05.0521°N, –075.7408°W; 856 m elev., 12.XI.2019; Héctor Fabio Arias Monsalve leg. (HFA 328); 1 juvenile, MHN-UCa-Am 1167.

Identification. The individuals were identified according to the morphological traits described by Mueses-Cisneros (2009) and Caicedo-Martínez et al. (2021): a large toad (SVL 80.40 mm), head broader than long, cranial ornamentation absent; tympanic membrane conspicuous and elliptical; vomerine teeth absent; finger I much longer than II; tarsal fold present; webbing on hands and basal webbing between toes both absent.

The color of specimen MHN-UCa 1540 matches the "dark coloration" morphotype (Mueses-Cisneros 2009: 35, fig. 6). This morphotype has the dorsal surface dark brown to black, with or without a yellow or orange mark on the parotoid gland, sacral and the posterior area of the cloaca; venter surface and concealed parts of limbs are cream, chest and gular zone are dark brown, and the cephalic flanks are orange or dark brown.

Characters used to identify the juvenile specimen (MHN-UCa-Am 1167; SVL 21.8 mm) were: head broader than long, cranial ornamentation absent; tympanic membrane conspicuous and elliptical; vomerine teeth absent; finger I much longer than II; tarsal fold present; webbing on hands and basal webbing between toes both absent (Mueses-Cisneros 2009; Caicedo-Martínez et al. 2021). The external patterns of specimen MHN-UCa 1167 match the previous description of juvenile specimens by Mueses-Cisneros (2009: 35, fig. 3).

Discussion

Our records of *Rhaebo haematiticus* from the Middle Cauca river valley are the first documented from the region and suggests that this species may occur throughout the whole of the middle and lower the Cauca river basin. These records come from the ecotone between the Cauca Valley Montane Forest and the Cauca Valley Dry Forest ecoregions. With this information, the species

Figure 1. *Rhaebo haematiticus* from the Cauca river basin in Colombia. **A.** Adult specimen (MHN-UCa-Am 1540; SVL 80.4 mm). **B.** Juvenile specimen (MHN-UCa-Am 1167; SVL 21.8 mm).

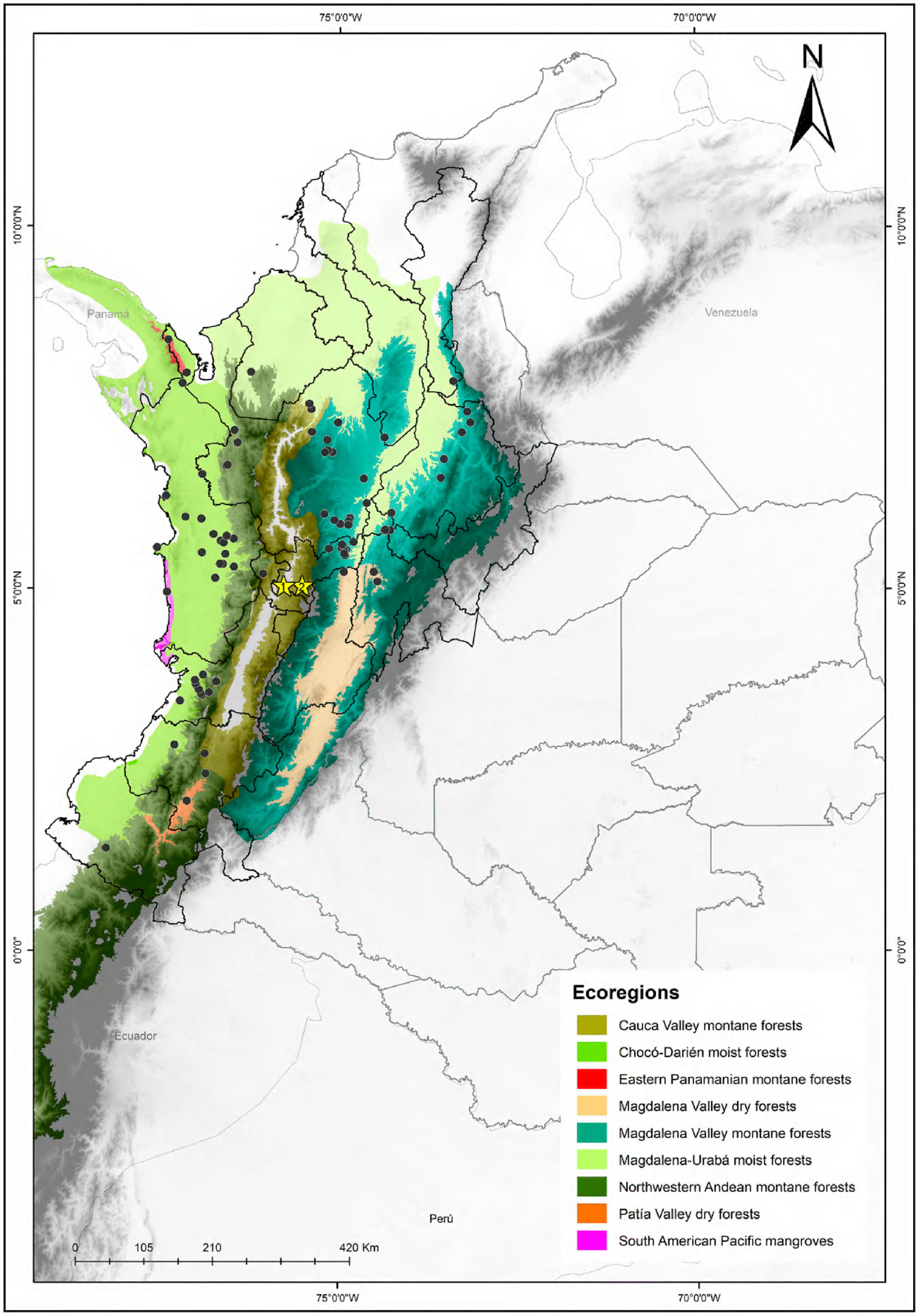

Figure 2. Updated records of *Rhaebo haematiticus* in nine ecoregions of Colombia. New records (yellow stars) are from the inter-Andean valley of the Cauca River. Historical records are based on Caicedo-Martínez et al. (2021).

is now known to be distributed in nine trans-Andean ecoregions in Colombia: the Chocó-Darien Moist Forests, South American Pacific Mangroves, Patía Dry Forests, Cauca Valley Montane Forests, Cauca Valley Dry Forests, Northwest Andean Montane Forests, Magdalena-Urabá Moist Forests, Magdalena Valley Dry Forests, and Magdalena Valley Montane Forests (Mueses-Cisneros 2009; Caicedo-Martínez et al. 2021; this study). Except for a single mention by Caicedo-Martínez et al. (2021) of the presence of *R. haematiticus* in the Cauca Valley bioregion, no records from this region were listed or mapped by them.

The association of *R. haematiticus* populations to riparian habits suggests that the Cauca River and its tributaries might be optimal habitats for this species, although the continuous land-use transformations in the last decades have turned the area in a homogeneous landscape (Correa-García et al. 2018). The southern and middle basin of the Cauca River have been extensively urbanized and modified for growing sugar cane. The land use of the middle basin has been altered for the cultivation of citrus fruits. Water pollution caused by illegal mining has affected the northern basin. These threats may be important in the population declines of several amphibian species, and decrease the availability of suitable habitats (Estrada 2010; Correa-García 2018; Restrepo 2018). The absence of previous records of *R. haematiticus* in the Cauca river basin may be due to the limited studies in the area due to the historical armed conflict in the country (Estrada 2010; Restrepo 2018). Finally, although CHEC Reserve in La Esmeralda may offer some protection for this and other species, we observed the presence there of the invasive American bullfrog, *Lithobates catesbeianus* (Shaw, 1802), which can be a threat to this and other native amphibian populations (Urbina-Carmona et al. 2011).

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Author Contributions

Conceptualization: HFAM. Data curation: HFAM, LSCM, JFCZ, ACG, HRC. Formal analysis: ACG. Investigation: HERC, JFCZ, LSCM. Visualization: ACG. Writing – original draft: HFAM, LSCM, ACG, HERC. Writing – review and editing: HFAM, LSCM, ACG, HERC.

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